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PATENT
Docket No. M 6401A-OS/PS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application of Natale, et al., a Divisional under 37 C.F.R. § 1.53(b) of:

Serial No. 09/363,555 Examiner: K. Egwim
Filed: 07/29/99 Art Unit: 1713
TITLE: STABILIZATION OF AQUEOUS EMULSION POLYMERS

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, DC 20231

Sir:

Preliminary to examination, please amend the application as follows:

In the specification:

Please replace the paragraph beginning at page 1, line 10, with the following rewritten paragraph:

--It has now been discovered that the branched products of the reaction of

A) at least one compound of formula I

$$R^1(X)_3 \qquad (I)$$

wherein each X group is a halogen atom or one X group is a halogen

atom and two X groups represent an epoxy oxygen atom, which is attached to two adjacent carbon atoms in the R^1 group to form an epoxy group, and R^1 is an alkanetriyl group containing from 3 to 10 carbon atoms; and--

Please replace the paragraph beginning at page 2, line 3, with the following rewritten paragraph:

-- B) at least one compound having the formula II

$$R(OE)_n(PO)m\text{-}OH \qquad (II)$$

wherein R is a substituted or unsubstituted, saturated or unsaturated aliphatic group having from 3 to 22 carbon atoms, n is a number of from 1 to 50, preferably from 3 to 50, and m is a number from 0 to 10; wherein the mole ratio of component A) to component B) is from about 0.60/1 to about 2/1, preferably from about 0.80/1 to about 2/1, are extremely efficient and effective emulsifiers for aqueous emulsion polymers, especially vinyl acrylic emulsion polymer systems.--

Please replace the paragraph beginning at page 3, line 14, with the following rewritten paragraph:

--With respect to the alkoxylates of formula II (component B), R can be any substituted or unsubstituted, saturated or unsaturated aliphatic moiety having from 3 to

22 carbon atoms. Thus, R can be a linear or branched alkyl group, a linear or branched alkenyl or alkynyl group, a saturated carbocyclic moiety, an unsaturated carbocyclic moiety having one or more multiple bonds, a saturated heterocyclic moiety, an unsaturated heterocyclic moiety having one or more multiple bonds, a substituted linear or branched alkyl group, a substituted linear or branched alkenyl or alkynyl group, a substituted saturated carbocyclic moiety, a substituted unsaturated carbocyclic moiety having one or more multiple bonds, a substituted saturated heterocyclic moiety, a substituted unsaturated heterocyclic moiety having one or more multiple bonds. Examples of the above include but are not limited to an alkyl group having from 3 to 22 carbon atoms, an alkenyl group having from 3 to 22 carbon atoms, and an alkynyl group having from 3 to 22 carbon atoms. R can also be an arenyl group. Arenyl groups are alkyl-substituted aromatic radicals having a free valence at an alkyl carbon atom such as a benzylic group. The preferred value of R is an alkyl group having from 3 to 22 carbon atoms and most preferably an alkyl group having from 8 to 10 carbon atoms. The degree of ethoxylation is preferably from 2 to about 50 with the most preferred being from 3 to about 50 while the degree of propoxylation can vary from 0 to 10 and is preferably 0. However, the degree of propoxylation will be determined by the desired degree of water solubility or miscibility. The water solubility or miscibility will ultimately be determined by such factors as the number of carbon atoms in R, the relative amounts of OE and OP and the effect of OP on the biodegradability of the final polymeric reaction product. The water solubility or miscibility of a reaction product

according to the invention and the interrelationships between the number of carbon atoms in R, the relative amounts of OE and OP and the biodegradability of the final product can be readily determined by one of ordinary skill in the art.--

In the claims:

Cancel claims 1-15.

Add the following claims:

16. (New) A method of stabilizing an emulsion polymer composition comprising adding to an emulsion polymerization composition an emulsion-stabilizing quantity of a branched polymeric base-catalyzed reaction product of: A) at least one epihalohydrin or trihaloalkane and B) at least one alkoxylated alcohol, wherein the mole ratio of component A) to component B) is from about 0.60:1 to about 2:1.

17. (New) The method of claim 16 wherein said emulsion-stabilizing quantity is added prior to carrying out the emulsion polymerization.

18. (New) The method of claim 16 wherein said emulsion-stabilizing quantity is added subsequent to carrying out emulsion polymerization with the emulsion polymer composition.

19. (New) The method of claim 16 wherein said mole ratio is from about 0.8:1 to about 2:1.

20. (New) The method of claim 16 wherein said emulsion-stabilizing quantity is in the range of from about 0.1 to about 5.0% by weight, based on solids.

21. (New) The method of claim 16 wherein component A) is an epihalohydrin.

22. (New) The method of claim 21 wherein the epihalohydrin is epichlorohydrin.

23. (New) The method of claim 21 wherein the mole ratio of component A) to component B) is from about 0.8:1 to about 2:1.

24. (New) The method of claim 16 wherein the emulsion polymer composition is a vinyl acrylic emulsion polymer composition.

25. (New) The method of claim 16 wherein the emulsion polymer composition also contains at least one other emulsifier.

26. (New) A method of stabilizing an emulsion polymer composition comprising adding to an emulsion polymerization composition an emulsion-stabilizing quantity of a branched polymeric base-catalyzed reaction product of:

A) at least one compound of formula I

$$R^1(X)_3 \qquad (I)$$

wherein each X group is a halogen atom or one X group is a halogen atom and two X groups represent an epoxy oxygen atom, which is attached to two adjacent carbon atoms in the R^1 group to form an epoxy group, and R^1 is an alkanetriyl group containing from 3 to 10 carbon atoms; and

B) at least one compound of the formula II

$$R(OE)_n(OP)m\ OH \qquad (II)$$

wherein R is a saturated or unsaturated organic group having from 3 to 22 carbon atoms, n is a number of from 1 to 50, m is a number from 0 to 10, EO represents an ethyleneoxy group, and OP represents a propyleneoxy group.

27. (New) The method of claim 26 wherein in said reaction product, R in component B) is an alkyl group.

28. (New) The method of claim 27 wherein R is an alkyl group containing from 3 to 10 carbon atoms.

29. (New) The method of claim 28 wherein the alkyl group contains from 8 to 10 carbon atoms.

30. (New) The method of claim 26 wherein in said reaction product, n in component B) is a number of from 3 to about 50 and m is zero.

31. (New) The method of claim 26 wherein the degree of polymerization of said reaction product is from about 2.0 to about 6.0.

32. (New) The method of claim 26 wherein component A) is an epihalohydrin, R in component B) is an alkyl group, n is a number of from 3 to about 50, and m is zero.

33. (New) The method of claim 32 wherein the degree of polymerization of said reaction product is from about 2.0 to about 6.0.

Preliminary Amendment for Divisional under 37 C.F.R. § 1.53 of Application Serial No. 09/363,555 filed July 29, 1999

REMARKS

Formal changes have been made to the specification for purposes of increased clarity.

Claims 1-15 have been canceled and new claims 16-33 added, which are all directed to a method for stabilizing an emulsion polymer composition.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page is captioned "Version with markings to show changes made".

An action on the merits is respectfully solicited.

Respectfully submitted,

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Preliminary Amendment for Divisional under 37 C.F.R. § 1.53 of Application Serial No. 09/363,555 filed July 29, 1999

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the specification:

Paragraph beginning at line 10 of page 1 has been amended as follows:

It has now been discovered that the branched products of the reaction of

A) at least one compound of formula I

$$R^1(X)_3 \qquad (I)$$

wherein each X group is a halogen atom or one X group is a halogen atom and two X groups [with two adjacent carbon atoms in the R^1 group and an oxygen atom] represent an epoxy oxygen atom, which is attached to two adjacent carbon atoms in the R^1 group to form an epoxy group, and R^1 is an alkanetriyl group containing from 3 to 10 carbon atoms; and

Paragraph beginning at line 3 of page 2 has been amended as follows:

B) at least one compound having the formula II

$$[R(EO)_n(PO)m\text{-}OH \qquad (II)]$$

$$R(OE)_n(OP)m\text{-}OH \qquad (II)$$

wherein R is a substituted or unsubstituted, saturated or unsaturated aliphatic group having from 3 to 22 carbon atoms, n is a number of from 1 to 50, preferably from 3 to 50, and m is a number from 0 to 10; wherein the mole ratio of component A) to component B) is from about 0.60/1 to

about 2/1, preferably from about 0.80/1 to about 2/1, are extremely efficient and effective emulsifiers for aqueous emulsion polymers, especially vinyl acrylic emulsion polymer systems.

Paragraph beginning at line 14 of page 3 has been amended as follows:

With respect to the alkoxylates of formula II (component B), R can be any substituted or unsubstituted, saturated or unsaturated aliphatic moiety having from 3 to 22 carbon atoms. Thus, R can be a linear or branched alkyl group, a linear or branched alkenyl or alkynyl group, a saturated carbocyclic moiety, an unsaturated carbocyclic moiety having one or more multiple bonds, a saturated heterocyclic moiety, an unsaturated heterocyclic moiety having one or more multiple bonds, a substituted linear or branched alkyl group, a substituted linear or branched alkenyl or alkynyl group, a substituted saturated carbocyclic moiety, a substituted unsaturated carbocyclic moiety having one or more multiple bonds, a substituted saturated heterocyclic moiety, a substituted unsaturated heterocyclic moiety having one or more multiple bonds. Examples of the above include but are not limited to an alkyl group having from 3 to 22 carbon atoms, an alkenyl group having from 3 to 22 carbon atoms, and an alkynyl group having from 3 to 22 carbon atoms. R can also be an arenyl group. Arenyl groups are alkyl-substituted aromatic radicals having a free valence at an alkyl carbon atom such as a benzylic group. The preferred value of R is an alkyl group having from 3 to 22 carbon atoms and most preferably an alkyl group having from 8 to 10 carbon

atoms. The degree of ethoxylation is preferably from 2 to about 50 with the most preferred being from 3 to about 50 while the degree of propoxylation can vary from 0 to 10 and is preferably 0. However, the degree of propoxylation will be determined by the desired degree of water solubility or miscibility. The water solubility or miscibility will ultimately be determined by such factors as the number of carbon atoms in R, the relative amounts of [EO] OE and [PO] OP and the effect of [PO] OP on the biodegradability of the final polymeric reaction product. The water solubility or miscibility of a reaction product according to the invention and the interrelationships between the number of carbon atoms in R, the relative amounts of [EO] OE and [PO] OP and the [boidegradability] biodegradability of the final product can be readily determined by one of ordinary skill in the art.